Missouri Assessment Program (MAP) Released Items - Spring 1999

High School Mathematics
(Grade 10)

Packet Contents

From Test Booklet:

"Flower Delivery" – Session 1 - Item 9
"Pizza Shop" – Session 2 - Items 7 and 9

Scoring Guides:

Session 1 – Item 9
Session 2 – Items 7 and 9

Missouri Department of Elementary and Secondary Education

FLOWER DELIVERY

Directions

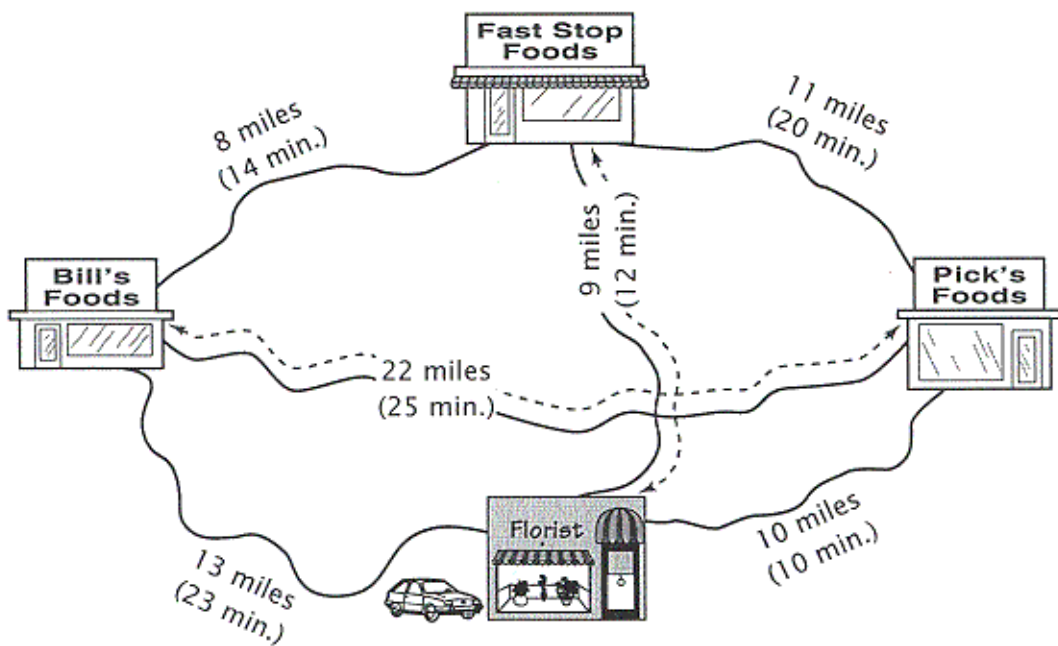Show all of your work and write your answers directly in this book.

9 You work as a delivery person for a florist shop. Your job requires that you use your own car, but the company pays you $0.30 a mile to cover your driving expenses.

Today you will be delivering flowers to three of your regular customers—Bill's Foods, Fast Stop Foods, and Pick's Foods. Your manager asks you to plan the most economical route to use, taking into account both the travel cost to the company *and* the travel time involved. (In your plan, do not use any road more than once.)

Use the information in the diagram below to help you determine the best route to choose, keeping in mind that you must return to the florist shop. Write a memo to your manager explaining the cost and time efficiency of the route that you choose and how it compares to the other possible routes. In your memo, provide the work that supports your explanation.

DAILY DELIVERY ROUTE

Not to Scale

MEMO

Pizza Shop

Directions

Numbers 7 through 9 are about your part-time job working at a pizza shop. Show all of your work and write your answers directly in this book.

7 During the last two weeks you have been recording how many pizzas you made during each work shift. The number of pizzas you made is shown below.

21, 14, 12, 20, 18, 12, 15

What is the average number of pizzas you made per shift? Provide the work that shows how you arrived at your answer.

Go On

9 Your manager asks you to slice a large stick of pepperoni and prepare individual packages. Each package should contain 6 slices of pepperoni for a mini-pizza, 16 slices for a medium, or 24 slices for a large. You want to cut enough slices to be able to make up packages for any *one* size of pizza. What is the *fewest* number of slices you should cut to make packages of 6, 16, or 24, without having any slices left over? Provide the work that shows how you arrived at your answer.
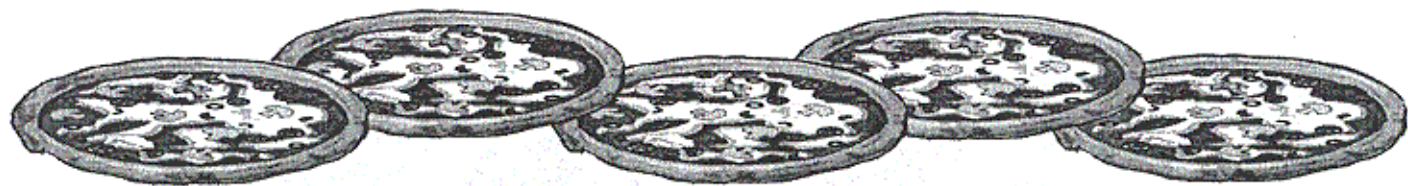
STOP

Session: 1

Item No.:   9

Page No.:   13

Content Standard(s):   6   Discrete Mathematics

Process Standard(s):   3.8

Score Points:

4 points   The student's response fully addresses the performance event.

The response:

- demonstrates knowledge of the mathematical concepts and principles needed to complete the event.
- communicates all process components that lead to an appropriate and systematic solution.
- may have only minor flaws with no effect on the reasonableness of the solution.

3 points   The student's response substantially addresses the performance event.

The response:

- demonstrates knowledge of the mathematical concepts and principles needed to complete the event.
- communicates most process components that lead to an appropriate and systematic solution.
- may have only minor flaws with minimal effect on the reasonableness of the solution.

2 points   The student's response partially addresses the performance event.

The response:

- demonstrates a limited knowledge of mathematical concepts and principles needed to complete the event.
- communicates some process components that lead to an appropriate and systematic solution.
- may have flaws or extraneous information that indicates some lack of understanding or confusion.

Session: 1

Item No.:   9

Page No.:   13

Content Standard(s):   6   Discrete Mathematics

Process Standard(s):   3.8

Score Points::

1 point   The student's response minimally addresses the performance event.

The response:

- demonstrates a limited knowledge of the mathematical concepts and principles needed to complete the event.
- communicates few or no process components that lead to an appropriate and systematic solution.
- may have flaws or extraneous information that indicates lack of understanding or confusion.

0 points   Other—Responses not addressed by the Condition Codes:
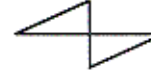
Examples of "0":

Work consists of copying the prompt information only.
Work indicates no mathematical understanding of the task.

Session: 1

Item No.:   9

Page No.:   13

Content Standard(s):   6   Discrete Mathematics

Process Standard(s):   3.8

Sample Solution:

Route		Path	Distance	Time
	A	F − B − FS − P − F	$13 + 8 + 11 + 10 = 42$	$23 + 14 + 20 + 10 = 67$
	B	F − FS − P − B− F	$9 + 11 + 22 + 13 = 55$	$12 + 20 + 25 + 23 = 80$
	C	F − FS − B − P− F	$9 + 8 + 22 + 10 = 49$	$12 + 14 + 25 + 10 = 61$

Route A: $42 \times \$0.30 = \$12.60$ and 67 minutes (least expensive route)
Route B: $55 \times \$0.30 = \$16.50$ and 80 minutes (most expensive route and longest route)
Route C: $49 \times \$0.30 = \$14.70$ and 61 minutes (fastest route)

Any explanation indicating one route is least costly ($12.60) but 6 minutes longer than the fastest route, or one route is the fastest (61 minutes) but costs $2.10 more than the least expensive route.

Must indicate time **and** cost comparison to receive full credit.

Session: 2

Item No.:   7

Page No.:   9

Content Standard(s):   3   Data Analysis, Probability, and Statistics

Process Standard(s):   1.10

Exemplary Response:

- 16 (pizzas)

AND

- $21 + 14 + 12 + 20 + 18 + 12 + 15 = 112$
  $112 \div 7$

  OR

  Other valid process

Score Points:

2 points   Exemplary Response

1 point   Correct process; error in computation

            OR

            Correct answer

0 points   Other

Session: 2

Item No.:   9

Page No.:   11

Content Standard(s):   5   Mathematical Systems and Number Theory

Process Standard(s):   3.1

Exemplary Response:

- 48 (slices)

AND

- $6 = 2 \times 3$
  $16 = 2 \times 2 \times 2 \times 2$
  $24 = 2 \times 2 \times 2 \times 3$
  $2 \times 2 \times 2 \times 2 \times 3$ (Least Common Multiple)

  OR

  6: 0, 6, 12, 18, 24, 30, 36, 42, <u>48</u>, 54
  16: 0, 16, 32, <u>48</u>, 64
  24: 0, 24, <u>48</u>, 72

  OR

  Other valid process

Score Points:

2 points   Exemplary Response

1 point   Correct process; error in computation

              OR

              Correct answer

0 points   Other